Draft Mathematics Glossary

Absolute value A number's distance from zero on a number line. The absolute value of -4 is 4; the absolute value of 4 is 4. Symbolically, |-4| = 4 and |4| = 4.

Acute angle An angle whose measure is between 0 and 90°.

Addends Numbers used in the mathematical operation of addition.

Addition A mathematical operation based on "putting things together".

Additive inverses (opposites) Two numbers whose sum is zero.

Adjacent angles Two coplanar angles that share a common side and a common vertex, but do not share common interior points.

Algebraic expression An expression that contains variables or symbols to represent quantities.

Algebraic sentence An equation or inequality that represents a relationship between two expressions.

Algorithm A set of step-by-step instructions for solving a problem.

Alternate exterior angles Angles formed by a transversal intersecting two lines; angles on opposite sides of the transversal, having two different vertices, and outside the lines. If the two lines are parallel, the alternate exterior angles are congruent.

Alternate interior angles Angles formed by a transversal intersecting two lines; angles on opposite sides of the transversal, having two different vertices, and between the lines. If the two lines are parallel, the alternate interior angles are congruent.

Angle A geometric figure consisting of two rays with a common endpoint.

Angle bisector A line that divides an angle into two congruent angles.

Approximation A result sufficiently exact for a specified purpose

Arc A part of a circle that consists of two points, called endpoints, and all points of the circle between them.

Area The measure of the surface inside a closed plane figure.

Arithmetic fact Any of the basic addition and multiplication relationships and the corresponding subtraction and division relationships.

Arithmetic sequence A set of ordered numbers in which the difference between consecutive terms is constant.

Array A rectangular arrangement of numbers or objects.

Ascending order An order in which numbers are organized in increasing value.

Associative property The property that states for real numbers a, b, and c, $(a + b) + c = a + (b + c)$ and $(ab)c = a(bc)$.

Attribute A common feature of a set of objects or numbers.

Average A measure of central tendency, generally considered to be the mean.

Axiom A self-evident truth; a truth without proof and from which further statements, or theorems, can be derived.

Axis Either of two perpendicular number lines used to form a coordinate plane.

Bar graph A graph in which horizontal or vertical bars represent data.

Base A number used as a factor for repeated multiplication (e.g., in 4^7, 4 is the base).

Base of a polygon The side(s) that is perpendicular to the height.

Base of a polyhedron Either of the two congruent parallel faces of a prism; the face of a pyramid that does not have to be a triangle.

Biased sample A sample that is not representative of a population.

Biconditional A logical statement containing the phrase “if and only if” (iff). Both the statement and its converse are true.

Binomial An expression consisting of two terms connected by a plus or minus sign (e.g., 4a+6).

Bisect To divide into two congruent parts.

Box-and-whisker plot A graph that uses a rectangle to represent the middle 50% of a set of data and line segments (or whiskers) at both ends to represent the remainder of data.

Capacity A measure of how much a container can hold.

Causation An act that produces an effect.

Census The count of an identified group about which data is being collected.

Centimeter In the metric system, a unit of measure equivalent to 1/100 of a meter.

Chord of a circle A segment joining any two points on the circle.

Circle A set of points in a plane equidistant from a given point called the center.

Circle graph (pie graph) A graph in which a circle is divided into sectors in order to compare different parts of a data set to the entire set.

Circumference The perimeter of a circle.

Closure Property A set is closed under an operation if the application of the operation on any

members in the set always results in a member of that set.

Coefficient The numerical factor in a term (e.g., in 7x, 7 is the coefficient).

Combinations A group of unordered items or events taken from a larger group (e.g., the number of three-person committees that can be chosen from a group of 21).

Common denominator Any nonzero number that is a multiple of the denominators of given fractions.

Common factor Any number that is a factor of two or more numbers (e.g., 4 is a common factor of 8 and 12).

Common Multiple A multiple of two or more numbers.

Commutative property The property that states for real numbers a and b, $a + b = b + a$ and $ab = ba$.

Complementary angles Two angles the sum of whose measures is 90°.

Complex fraction A fraction that contains one or more fractions in the numerator or denominator.

Complex number A number that can be written in the form a + bi, where a and b are real numbers and i is the imaginary number, $\sqrt{-1}$.

Composite number A natural number that has more than two natural number factors.

Concave polygon A polygon with one or more diagonals that have points outside the polygon.

Conclusion The *then* part of a conditional statement.

Conditional statement A statement in “if-then” form where the “if” portion is called the hypothesis and the “then” portion is called the conclusion.

Cone A three-dimensional figure with one curved surface, one flat surface (usually circular), one curved edge, and one vertex.

Congruent Having the same shape and size.

Conjecture A statement that seems to be true but is not proven.

Constant A quantity that always stays the same, or in an algebraic expression, a term that does not contain a variable.

Contextual situation Relating a mathematical problem to a real, modeled or illustrated circumstance.

Contrapositive of a statement A new statement obtained by exchanging the negation of the conclusion with the negation of the hypothesis of a conditional statement.

Converse of a statement A new statement obtained by exchanging the hypothesis and the conclusion of a conditional statement.

Convex polygon A polygon that is not concave.

Coordinate system (Cartesian) A two dimensional system in which the coordinates of a point are its distances from two intersecting, usually perpendicular, straight lines called axes.

Coordinates of a point An ordered pair of real numbers that locates a point in a plane.

Coplanar In the same plane.

Correlation An association between two variables.

Corresponding angles Angles formed by a transversal intersecting two lines; angles on the same side of the transversal, having two different vertices, and in the same relative position. If the two lines are parallel, the corresponding angles are congruent.

Cosine In a right triangle, the ratio of the length of the leg adjacent to an acute angle to the length of the hypotenuse.

Counterexample An example that shows that a conjecture is not always true.

Counting numbers (natural numbers) The set of numbers consisting of 1, 2, 3, 4, 5, 6, ...

Cube The third power of a number; a regular three dimensional figure having six congruent square faces.

Customary system of measurement The measuring system used most often in the United States (e.g., inches, pounds, gallon).

Cylinder A three dimensional figure composed of two congruent and parallel circular regions joined by a curved surface.

Data Information gathered by observation, questioning or measurement, usually expressed with numbers.

Decimal number system A place value number system based on groupings by tens.

Decimal point The point used to write values less than one in the base ten number system.

Deductive reasoning A series of logical steps in which a conclusion is drawn directly from a set of statements (premises) that are known or assumed to be true.

Degree A unit of measure for angles based on dividing a circle into 360 equal parts; or a unit of measure for temperature.

Denominator The number of equal parts into which a whole is divided (e.g., in the fraction ¾, 4 is the denominator).

Density property Between any pair of rational numbers there is another number.

Dependent events Two events in which the outcome of the first event affects the outcome of the second event.

Dependent variable In a function, the variable that is determined by the value of the related independent variable.

Descending An order in which numbers are organized in decreasing value.

Diagonal A line segment joining two non-adjacent vertices of a polygon.

Diameter A chord that contains the center of the circle.

Difference The result of subtraction.

Digit In the base ten numeration system, one of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Dilation A transformation that either enlarges or reduces a geometric figure proportionately.

Dimension A measure in one direction. For example, length or width.

Discrete mathematics The study of mathematical properties of sets and systems that have a finite number of elements.

Distance The length of the shortest line segment joining two points.

Distance formula A formula used to find the distance between two points identified by their ordered pairs: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Distributive property For any numbers a, b, and c, a(b + c) = ab + ac and a(b - c) = ab - bc.

Dividend The quantity to be divided.

Divisible by One whole number is divisible by another whole number if the result of the division is a whole number.

Division A mathematical operation based on separating into equal parts.

Divisor The quantity by which another quantity is divided.

Domain The set of values for the independent variable of a function (e.g., the x values of a function).

Edge of a polyhedron A line segment where two faces of a polyhedron meet.

Edge of a vertex-edge graph The path that joins two vertices.

Ellipsis The mark **…** to indicate the continuance of a pattern.

Empty set A set that contains no elements.

Endpoint The point at either end of a line segment; also, the point at the end of a ray.

Equation A mathematical sentence that contains an equal sign.

Equivalent Equal in value, but in a different form.

Equilateral triangle A triangle with three congruent sides.

Estimate A calculation of a close rather than exact answer.

Evaluate To find the numerical value of a mathematical expression.

Even number An integer that is divisible by two.

Expanded notation A way to write numbers that shows the place value of each digit.

Experimental (Emperical) probability Relating to the outcomes of an actual performance of a probability activity.

Exponent a number placed to the right of and above a non-zero base that indicates how many times the base is used as a factor. A base with a zero exponent is equal to 1 (e.g., $5^0 = 1$, $5^3 = 5 \cdot 5 \cdot 5$ and $5^{-3} = \frac{1}{5^3} = \frac{1}{5 \cdot 5 \cdot 5}$).

Exponential function A function commonly used to study growth and decay. It has a form $y = a^x$.

Face of a polyhedron A flat surface on a three-dimensional shape.

Fact family A collection of related addition and subtraction facts, or multiplication and division facts, made from the same numbers.

Factor (noun) A number or expression that evenly divides another quantity (e.g., 4 is a factor of 12; $(x + l)$ is a factor of $x^2 + 3x + 2$).

Factor (verb) To represent a number as a product of factors.

Finite set A set that contains a countable number of elements.

Formula A general mathematical statement, equation, or rule.

Fractal An algebraically generated complex geometric shape having the property of being endlessly self-similar under magnification.

Fraction A number in the form $\frac{a}{b}$, where b is not zero.

Frequency table A collection of data that specifies the number of occurrences in each of several categories.

Function A dependent relationship between two sets of numbers in which a value in the first set has only one defined element in the second set.

Geometric model A model of numeric concepts using geometric representations.

Geometric sequence A set of ordered numbers in which the ratio between consecutive terms is constant.

Geometric Solid A three dimensional shape bounded by surfaces (e.g., rectangular prism, pyramid, cylinder, cone, and sphere).

Graph A pictorial device that shows a relationship between variables or sets of data.

Graphic organizer Pictorial representation of data.

Greatest common factor (GCF) The largest factor that two or more numbers have in common (e.g. the GCF of 8 and 12 is 4).

Grouping symbols Parentheses, brackets, braces or bars that indicate the order in which operations in an expression are to be done.

Height The perpendicular distance to a base from a vertex or between bases.

Hexagon A polygon with six sides.

Histogram A vertical bar graph with each bar representing a certain interval of data.

Hypotenuse The side opposite the right angle in a right triangle.

Hypothesis The *if* part of a conditional statement.

Identity element A number when used in an operation with a given number leaves the given number unchanged. The identity element for addition is zero; the identity element for multiplication is 1.

Image A figure created when a figure undergoes a transformation.

Imaginary numbers The square root of a negative number usually expressed using i ($\sqrt{-1} = i$).

Improper fraction A fraction in which the numerator is greater than the denominator.

Independent events Two events in which the outcome of the first event does not affect the outcome of the second event.

Indirect proof A deductive proof using contradiction or elimination to rule out all possible conclusions except the desired one.

Inductive reasoning Making a generalization based on observation of specific cases or patterns.

Inequalities Statements indicating that two quantities are not equal.

Infinite set The set in which the number of elements is not a natural number.

Integers The set of numbers consisting of the whole numbers and their opposites … -2, -1, 0, 1, 2 …

Interval The set of numbers between two numbers a and b; the interval may include a or b.

Inverse operation A related but opposite process (e.g., multiplication is the inverse of division).

Inverse of a statement A new statement obtained by negating both the hypothesis and the conclusion of a conditional statement.

Irrational numbers A set of numbers that cannot be expressed as a ratio of two integers (e.g., $\pi, \sqrt{2}$).

Isosceles triangle A triangle that has two congruent sides.

Iterative pattern A pattern generated by using an initial value and repeatedly applying an operation (e.g., 4,7,10,13,…; 2,4,8,16,…).

Least common multiple The smallest number that is a multiple of two or more numbers (e.g. the LCM of 3, 4, and 6 is 12).

Line An undefined geometric term; a straight path that extends infinitely in opposite directions.

Line graph A graph in which points are connected by line segments to represent data.

Line of best fit A line drawn on a scatter plot to estimate the relationship between two sets of data.

Line of symmetry A line that divides a figure into two congruent halves that are mirror images of each other.

Line plots A sketch of data in which check marks, X's, or other marks above a number line shows the frequency of each value.

Line segment A part of a line that consists of two points, called endpoints, and all the points between them.

Linear equation An equation whose graph in a coordinate plane is a straight line.

Linear function A function that has a constant rate of change and can be modeled by a straight line.

Liter A metric unit of capacity, equal to the volume of a cube that measures ten centimeters on a side.

Logic A system of reasoning used to validate arguments.

Lowest common denominator The least common multiple of the denominators of every fraction in a given collection of fractions.

Magnitude Size or quantity.

Manipulatives A wide variety of physical materials and supplies that students use to foster the learning of abstract ideas in mathematics.

Matrix (matrices) A rectangular array of numbers or letters arranged in rows and columns.

Maximum The greatest value of a function.

Mean A measure of central tendency where the sum of a set of numbers is divided by the number of elements in the set; often referred to as the average.

Measures of central tendency Numbers that communicate the "center" or "middle" of a set of data. The mean, median and mode are statistical measures of central tendency.

Median A measure of central tendency that identifies a value such that half the data is above the value and half the data is below the value.

Metric system of measurement A measurement system based on the base-ten numeration system (e.g. meter, liter, gram).

Midpoint A point on a geometric figure halfway between two points.

Minimum The least value of a function.

Mixed number A number that is equal to the sum of a whole number and a fraction.

Mode A measure of central tendency which is the value that occurs most frequently in a given set of numbers.

Model (noun) A display of concrete materials, objects or drawings.

Model (verb) Use of concrete materials, symbolic.

Monomial An expression consisting of a single term (e.g., 5y).

Multiple of a number A number into which the given number may be divided with no remainder.

Multiplication The operation of repeated addition.

Natural numbers (counting numbers) The set of numbers consisting of 1, 2, 3, 4, 5, 6, ...

Negative number A number less than zero.

Net of a polyhedron A two-dimensional shape that can be folded into a three-dimensional figure.

Normal curve In statistics, the distribution of data along a bell-shaped curve that reaches its maximum height at the mean.

Number line A diagram that represents numbers as points on a line.

Number sentence An equation or inequality with numbers.

Numerator The number or expression written above the line in a fraction.

Numeric expression A combination of numbers and symbols that represents a mathematical value.

Obtuse angle An angle whose measure is greater than 90° and less than 180°.

Octagon A polygon with eight sides.

Odd number An integer that is not divisible by two.

Open sentence A statement that contains at least one unknown. e.g., 6 + x = 14.

Ordered pair A pair of numbers used to locate points in the coordinate plane.

Ordinal number A whole number that names the position of an object in a sequence.

Origin The intersection of the *x*- and *y*-axes in a coordinate plane.

Outcome A possible event.

Parallel lines (segments, rays) Lines (segments, rays) in the same plane that never intersect and are always the same distance apart.

Parallelogram A quadrilateral whose opposite sides are parallel and congruent.

Pattern A set of shapes or numbers that are repeated in a predictable manner.

Pentagon A polygon with five sides.

Percent (%) A ratio that compares a number to 100.

Perfect square A rational number whose square root is a rational number.

Perimeter The distance around a figure.

Permutations Ordered arrangements of a given number of items in a set.

Perpendicular lines Two lines that intersect to form right angles.

Pi (π) The ratio of the circumference of a circle to its diameter. Pi is an irrational number.

Pictograph A graph that uses pictures or symbols to represent data.

Place value The value of the position of a digit in a number.

Plane An undefined geometric term; a flat surface that extends infinitely in all directions and has no thickness.

Point An undefined geomtric term; denotes a location in space.

Polygon A closed two-dimensional figure made up of segments, called sides, that intersect only at their endpoints, called vertices.

Polyhedron (polyhedra) A closed three-dimensional figure in which all the surfaces are polygons.

Polynomial An expression consisting of two or more terms.

Postulate A mathematical statement that is accepted as true without proof.

Power A number with a base and an exponent.

Pre-image A picture or object before it is transformed.

Premise A statement that is given to be true.

Prime number A positive integer that has exactly two different positive factors, itself and one.

Prime factorization A composite number expressed as a product of factors that are prime numbers.

Prism A three-dimensional figure that has two congruent and parallel faces that are polygons. The remaining faces are parallelograms.

Probability The measure of the likelihood of an event occuring.

Product The result of mulitplication.

Proof A logical argument that shows why a statement must be true.

Proper fraction A fraction whose numerator is an integer smaller than its integral denominator.

Proportion The statement of equality between two ratios.

Pyramid A three-dimensional figure whose base is a polygon and whose other faces are triangles that share a common vertex.

Pythagorean theorem In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

Quadrant One of the four sections into which the coordinate plane is divided by the *x*- and *y*-axes.

Quadratic formula The formula used to solve quadratic equations.

$$\text{If } ax^2+bx+c=0,\ a\neq 0,\ \text{then } x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}.$$

Quadratic function A function that has an equation of the form: $y=ax^2+bx+c,\ a\neq 0$

Quadrilateral A polygon with four sides.

Quartiles Along with the median, the quartiles divide an ordered set of data into four groups of the same size.

Quotient The result of division.

Radius of a circle (radii) A segment whose endpoints are the center of the circle and a point on the circle.

Range The difference between the greatest and least number in a set of numbers; or the set of values for the dependent variable.

Rate A ratio comparing two different units. e.g., miles per hour or cents per pound.

Ratio A comparison expressed as indicated division. A ratio can be expressed as a to b, $\frac{a}{b}$, $a:b$.

Rational number A number that can be expressed as a ratio of two integers.

Ray A geometric figure that extends infinitely along a straight path from a point, called its endpoint.

Real numbers The set of numbers consisting of the rational and irrational numbers.

Reciprocals (multiplicative inverses) Two numbers whose product is equal to one.

Rectangle A parallelogram with four right angles.

Recursive pattern A series of numbers in which values are derived by applying a formula to the previous value(s) (e.g., 2,3,5,8,…).

Reflection A transformation creating a mirror image of a figure on the opposite side of a line.

Reflexive property The property that states a quantity is equal to itself; the property that states an object is congruent to itself.

Regular polygon A convex polygon in which the angles and sides are congruent.

Relation A set of ordered pairs.

Repeating decimal A decimal in which one or more digit(s) repeat without termination.

Rhombus A parallelogram with four congruent sides.

Right angle An angle whose measure is 90°.

Right triangle A triangle that contains a right angle.

R**otation** A transformation in which a figure is turned a given angle and direction around a point.

Round To approximate a number by analyzing a specific place value.

Same side exterior angles Angles formed by a transversal intersecting two lines; angles on the same side of the transversal, having two different vertices, and outside the two lines. If the two lines are parallel, the same side exterior angles are supplementary.

Same side interior angles Angles formed by a transversal intersecting two lines; angles on the same side of the transversal, having two different vertices, and inside the two lines. If the two lines are parallel, the same side interior angles are supplementary.

Sample A part of the total population; used in statistics to make predictions about the characteristics of the entire group.

Scale factor The ratio between the lengths of corresponding sides of two similar figures.

Scalene triangle A triangle with no sides of the same length.

Scatter plots A graph of the points representing a collection of data.

Scientific notation A number expressed as the product of a decimal number greater than or equal to one and less than ten and a power of ten.

Secant A line that intersects a circle at exactly two points.

Sector A region bounded by an arc and two radii of a circle.

Similar figures Figures that are the same shape but not necessarily the same size.

Sine A trigonometric function that is defined as the ratio of the leg opposite the acute angle to the hypotenuse of its right triangle.

Skip counting Counting by equal intervals.

Slope of a line The ratio of rise over run; or change in y over change in x.

Solution A value for a variable that makes an equation or inequality true.

Solution set A set consisting of all values that make an equation or inequality true.

Sphere The set of all points in space equidistant from a given point called the center.

Square A parallelogram with four congruent sides and four right angles.

Square root of a number A value which when used as a factor twice results in the number.

Standard notaton A number written with one digit for each place value in base ten.

Statistics The collection, organization, discription and analysis of data.

Stem-and-leaf plot A method of ordering and organizing data.

Straight angle An angle whose measure is 180°; it forms two opposite rays.

Substitution property The property that allows equal values to replace each other.

Subtraction A mathematical operation based on “taking away”.

Sum The result of addition.

Supplementary angles Two angles the sum of whose measures is 180°.

Surface area The total area of the faces (including the bases) and curved surfaces of a three-dimensional figure.

Symmetric property The property that states for real numbers a and b, if $a = b$, then $b = a$.

Symmetry A correspondence in size, form and arrangement of parts related to a plane, line or point. For example, a figure that has line symmetry has two halves that coincide if folded along a line of symmetry.

System of equations Two or more equations with the same variables.

Tangent A trigonometric function that is defined as the ratio of the lengths of the leg opposite an acute anlge to the leg adjacent to the acute angle in a right triangle.

Tangent to a circle A line in the plane of a circle that touches a circle in exactly one point.

Term A number, variable, product, or quotient in an expression. A term is not a sum or difference.

Terminating decimal A decimal that contains a finite number of digits.

Tessellation An arrangement of closed shapes that covers a surface completely without overlaps or gaps.

Theorem A mathematical statement or proposition derived from previously accepted results.

Theoretical probability Relating to the probability of a given event, using mathematical relationships.

Transformation An operation that creates an image from an original figure, or pre-image.

Transitive property The property that states for real numbers a, b, and c, *if* $a = b$ and $b = c$, then $a = c$.

Translation A transformation that moves every point on a figure a given distance in a given direction.

Transversal A line that intersects two or more lines in a plane at different points.

Trapezoid A quadrilateral that has exactly one pair of parallel sides.

Trend line A line which represents a general pattern for a set of data.

Triangle A polygon with three sides.

Trigonometric ratios The ratios of the lengths of pairs of sides in a right triangle, e.g., sine, cosine and tangent.

Trigonometry The branch of mathematics based on properties of right triangles.

Unbiased sample A sample that is representative of a population.

Unit fraction A fraction with a numerator of one.

Unit price The price for one unit of measure.

Valid argument An argument that is correctly inferred or deduced from a premise.

Variability Numbers that describe how spread out a set of data is (e.g., range and quartile).

Variable A symbol that represents a quantity.

Venn diagram A picture that uses circles to show relationships between sets.

Vertex-edge graph A structure consisting of vertices and edges, where the edges indicate a mapping among the vertices (e.g., the vertices may represent players in a tournament, and the edges indicate who plays whom).

Vertex (vertices) The point at which the rays of an angle, two sides of a polygon, or the edges of a polyhedron meet.

Vertical angles The opposite angles formed when two lines intersect.

Volume The measure of the capacity of a three-dimensional figure.

Whole The entire object, collection of objects, or quantity being considered.

Whole numbers The set of numbers consisting of the counting numbers and zero 0, 1, 2, 3 . . .

x**-intercept** The coordinate at which a graph intersects the x-axis.

y**-intercept** The coordinate at which a graph intersects the y-axis.